XI. "On the Production of Coloured Spectra by Light." By Captain Abney, R.E., F.R.S. Received June 9, 1879.

(Preliminary Note.)

Last year I incidentally mentioned in a note to the Royal Society ("Proceedings," vol. xxviii, p. 291), that the production of natural colours by the agency of light, examples of which were shown by Becquerel, was probably caused by the oxidation of silver compounds employed. I have ventured to return to the subject, in order to show that the colours are so produced and are not due to interference.

I have sent, for the Society's inspection, pictures of the solar spectrum on silver plates, and also on compounds of silver held *in situ* by collodion. It will be observed that the spectrum has imprinted itself in approximately its natural colours; that on the silver plates it is more brilliant than on the collodion film, but that in the latter the colours are seen by transmitted as well as by reflected light.

I reserve for the present the exact details of the production of these pictures, but may say that they are produced by oxidation of silver compounds when placed in the spectrum; an exposure of two minutes being amply sufficient with a wide slit to impress the colours. The colouring matter seems to be due to a mixture of two different sizes of molecules of the same chemical composition, one of which absorbs at the blue end and the other at the red end of the spectrum, and the sizes of these molecules are unalterable whilst exposed to the same wave-lengths as those by which they were produced. I believe it possible and probable that the colours may be preserved unchanged when exposed to ordinary daylight.

XII. "Relations between the Atomic Weights and certain Physical Properties (Melting and Boiling Points and Heats of Formation) of Elements and Compounds." By Thomas Carnelley, D.Sc., Assistant Lecturer on Chemistry in Owens College, Manchester. Communicated by Professor H. E. Roscoe, F.R.S. Received June 10, 1879.

(Abstract.)

The object of the present paper is to trace the influence of the atomic weights on the melting and boiling points and heats of formation of elements, and especially of their compounds. It is shown that, as regards the elements, the melting points are a periodic function